

Pre-AP CHEMISTRY Basic Math Skills Practice

The purpose of this worksheet is to give you an idea of the math skills you will need in this class. Try to work every problem out and know how to complete the math behind it. You may be quizzed over problems very similar to these. Use additional paper to show all work but show and Circle answers on this sheet.

Exponents (Scientific Notation)

1. Write 32,000 in exponential form (i.e., in “scientific notation”).
2. Write 0.00044 in exponential form.
3. Calculate the expressions below.
 - a. $(2.50 \times 10^{-1}) + (2.5 \times 10^{-2})$
 - b. $(8.19 \times 10^{-3}) - (4.0 \times 10^{-1})$
 - c. $\frac{(6.032)}{6.02 \times 10^{23}}$
 - d. $(4.0 \times 10^{-3})(7.0 \times 10^{-5})^2$

Fractions, Decimals, and Percentages

4. Express 20% as a fraction.
5. Express 58% as a decimal.
6. A student earns 32 of a possible 40 marks on a chem. Quiz, express this grade as a percentage.

Algebra

7. If

$$x = \frac{(y - 30)5}{11}$$

Find the value of x (to 2 decimal places) when $y = 20$.

8. If $a = -b + 64c$, find the value of c when $a = 400$ and $b = 112$.
9. Find the value of x if $9x^3 = 2.5 \times 10^{-48}$.
10. The formula for solving a quadratic equation of the type

$$ax^2 + bx + c = 0, \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}.$$

Find the two possible values for x if $x^2 + 5.0x - 2.5 = 0$

11. What is the volume of a sphere with a **diameter** of 4.5cm ($V_{\text{sph}} = \frac{4}{3} \pi r^3$)? Round to nearest whole number.

Logarithms and Natural Logarithms

12. Determine the logarithm (to the base 10) of 0.26

Find the value of x if

12a. $x = -\log_{10}(5 \times 10^{-3})$

12b. $x = \log_{10} [(2 \times 10^{-4}) / (2 \times 10^{-3})]$

12c. $-\log_{10} x = 9.23$

12d. $\log_{10} x = 15$

Graphing and Word Problems and Patterns

13. Mr. Warren Buffett invested \$20 000. Part of it he put in the bank at 5% interest. Part of it he invested in bonds which pay a 7% return. How much money did he put in each investment, if his annual income from these investments was \$1 200?

14. Using the following formula, $s(V_1 + V_2) = s_1V_1 + s_2V_2$: where V is the various volumes and s equals the various concentrations. A mixture containing 6% salt is to be mixed with 2 liters of a mixture which is 15% salt, in order to obtain a solution which is 12% salt. How much of the first solution must be used?

15. A mechanic charges \$125 plus \$25 per hour of labor. The equation $c=25n+125$ describes the total she would charge for a service visit, where n represents the number of hours of labor and c is the total cost. **Graph the equation** and using the graph, find how much he charges when she works 3 hours.

16. You have to fasten together 3 metal spheres. Each sphere consists of 2 half spheres and requires 25 bolts to hold a single sphere together. If 2 nuts are needed for 1 bolt and 1 nut needs 2 washers, how many washers will you need to use?

17. If the washers from questions 16 weigh 5grams each and the total weight of each sphere is 5,000grams what percent of the total weight of all 3 spheres is made of washers?

The Metric System

18. If there are a 1000 ml per 1 L and a 1000g per kilogram

a. How many ml are there in 5.0 L?

b. How many kg are there in 230g?

19. Convert:

a. 0.54 L to mL

b. 1.6 kg to grams.

20. List these distance units in order from *smallest* to *largest*: cL, mL, L, dL